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Logging, Plantation, Mining, Industrial & Standard Railroad Motive Power.

SHAY Locomotives



Sewell Valley Railway, 90 Ton Shay Locomotive Hauling Mixed Train

Are Particularly Adapted for Heavy Hauling as well as Logging

The Shay Locomotives have been constantly improved, from the standpoints of design, workmanship and material. We are profiting by our experience of more than thirty years, combined with the practical suggestions of users, which have worked out in practice. Hence, Shay Locomotives embody the experience of our customers and our own—built in accordance with modern demands.

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Builders of

Locomotives of All Types

Lima, Ohio



VOL. 7, NO. 8 LIMA, OHIO December, 1914

THE LOCOMOTIVE WORLD

PUBLISHED MONTHLY BY

THE FRANKLIN TYPE AND PRINTING COMPANY

H. C. HAMMACK, Editor

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THE FRANKLIN TYPE AND PRINTING COMPANY

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LOOKING AHEAD

NOTWITHSTANDING the general business depression which seems to have befallen almost every industry in the country there are signs of light ahead, as many of the large factories scattered over the country have received orders from the nations at war which will keep their plants busy for months to come. The general consensus of opinion is to the effect that we are on the eve of an era of great prosperity. Our country is sound and we are bound to profit from the oversea trade which is coming and which we see is stronger with each successive day. Many news items like the following have appeared almost daily in the papers, and while we find it necessary to consider that a certain percentage of these are only rumors, yet we feel safe in assuming that at least twenty-five percent are bona fide reports.

"BIG ORDER FOR TIES

ENGLISH GOVERNMENE PLACES ORDER FOR 3,000,000 FEET OF TIES WITH HOUSTON COMMISSION FIRM

The English government has placed an order for 3,000,000 feet of sound square edge ties with Foster & Barrow, the well-known Houston commission firm. Foster & Barrow placed the work in the hands of saw mills in the vicinity of Lake Charles. The order is to be filled and shipped out of Galveston".

Not considering the sales to foreign countries we must remember that we have at home a hundred million consumers and this market is steadily expanding. One of the greatest lessons the European War has taught the masses of our people is to be dependent upon American-made goods, and furthermore to cultivate the habit of using American-made goods in preference to that produced in any other country. Therefore, with the foreign-made goods shut out on account of these nations being busily engaged with war, the increased demand for our goods at home as well as other nations which are not at war having mainly to depend on the United

States good times are sure to come soon. Shall we be ready to take care of our share, or will we be suffering the inevitable effects of neglect of splendid opportunities. At this time it looks like we should act on the old saying "In time of peace let us prepare for war" not with sabre and shell but for the great commercial war which is awaiting our people. We should make certain improvements to plant and machinery which can be made at present at no doubt lower prices than will likely prevail again in this country for years to come. Since the Interstate Commerce Commission has granted the five per cent rate increase, railways are beginning to place orders for supplies and equipment, and the question has been put to many "What amount of business in railway equipment is likely to come when the railroads begin to make heavy purchases? No one can tell. However, when such men as President Rea of the Pennsylvaniz R. R. states that fully ten per cent of the locomotives and twenty per cent of the freight cars on his road are out of commission and requiring heavy repairs, rebuilding and replacements, we can get a fair average of the country's needs. Probably 3500 new locomotives will be needed by the railroads in this country for replacements during 1915 and at least an equal number should have important repairs.

The private railroad owners operating in lumbering plants, mining plants, industrial plants, quarries, etc., should not lose the present opportunity to renew and repair their equipment.

The many large locomotive plants are in better position to take care of the wants of these thousands of owners right now than they will be later on when the railroads let loose and commence to flood these plants with orders.

Now is the time to prepare to meet your share of the enlarged demand which will be brought about by our people at home, to say nothing of the demand which is sure to come from the nations at war.

Let us start the slogan "Get Busy".

WILL MANUFACTURE WESTERN PINE

Somers Lumber Company Establishes Camp and Puts in New Equipment for Large Cut

SOMERS, MONT.,—The Flathead Valley has long been famed as the home of larch lumber but the Somers Lumber Company, with large mill plant at this place, on the shore of Flathead Lake, will next year add Idaho white pine to the list of lumber products of Flathead Valley. Under the supervision of W. R. Ballord, general manager of the company, a new camp has been established at the head of Swan Lake, which will be the center of operations this winter for putting in a large quantity of Idaho white pine logs for next year's sawing.

A 42-ton Shay locomotive was recently purchased and transported over about thirty miles of water and hills to the new camp, it being necessary to build a scow to take the locomotive up to the head of the lake as there was no available road on the route passable for anything but pack horses.

About eight miles of 50-pound steel and enough logging flat cars to handle the business were also shipped. In addition to this the Somers company has purchased one of the latest Lidgerwood 10 x 10 tower skidders, which was sent up into the timber in the same way. The logging operations are under the supervision of J. E. Craney, formerly with the Spokane Lumber Company, at Milan, Wash., and it is planned to put in about 25,000,000 feet of logs in time for next spring's drive, a large part of this of the finest quality of Idaho white pine. In some places the timber runs as high as 70 per cent white pine.

The plant of the Somers Lumber Company has been operating two shifts daily, averaging about 262,000 feet, board measure, of lumber every twenty hours. It is fortunate in having an order that has kept the plant running steadily to capacity this fall. The mill is equipped with two 9-foot single cutting band saws and in the center of the mill there is operated a band resaw for splitting cants into the triangular self tamping ties that are used by the Great Northern Railroad in this section of Montana. The ties are treated at a preserving process plant adjoining the mill, owned and operated by the railroad. This year about 68 per cent of the entire output of the Somers Lumber Company's mill was run into these triangular ties. The company has a good stock of logs on hand and will go into winter with 7,000,000 or 8,000,000 feet of logs for early sawing next spring, as soon as the ice breaks up in the lake. At present the company has an excellent stock of western pine, larch and fir lumber in pile.—American Lumberman.

Logging Roads to Supersede Drives

ORINO, ME., Nov. 30.—Speaking before the members of the Forestry Club at the University of Maine, E. Lisherness, the Bangor forest engineer, predicted that the picturesque log drive on the small streams of Maine and vicinity will soon be done away with. He declared that the logging railroad is the cheapest and most efficient means of transporting raw material from the scene of operations and within another decade will be universally adopted here.

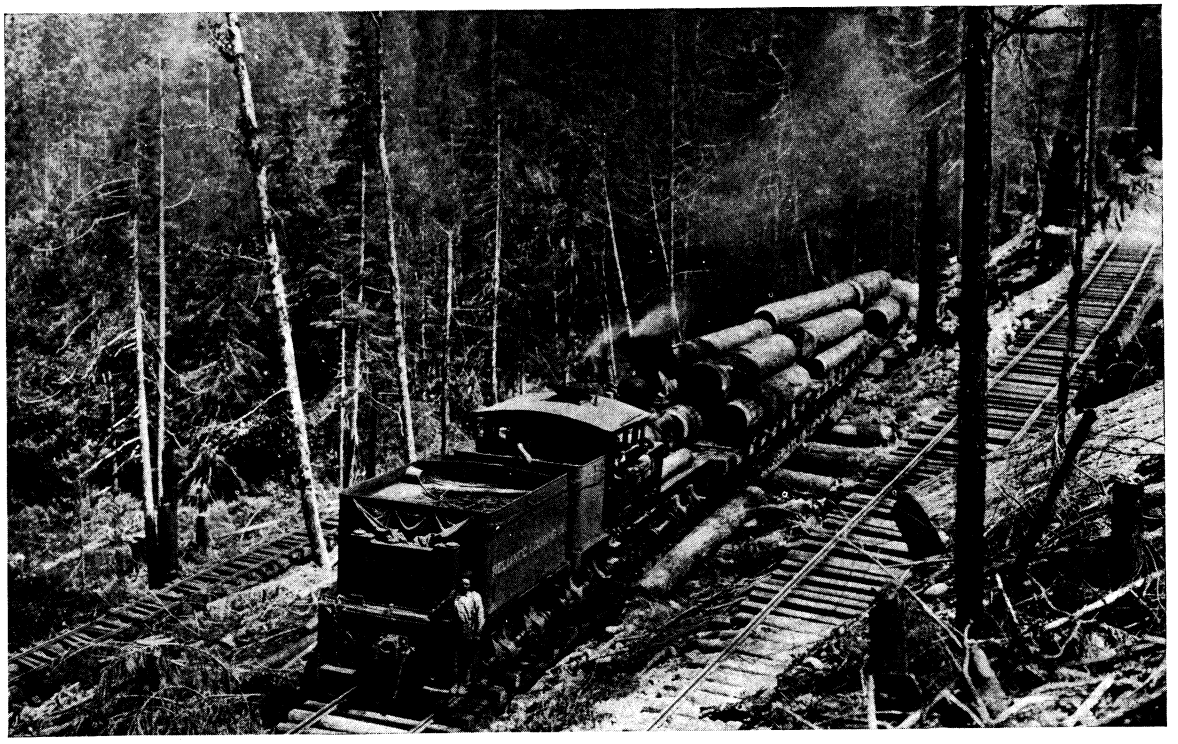
"This will be the method for the future where

(Continued on Page 9)

The Engine for Rough Country

IT is a well known fact that the greatest volume of timber left standing in the forests today is in such localities which are not accessible to any easy method of logging. While there are many years' cut of standing timber in the United States, Canada and Mexico, the lumberman finds that each year brings greater hardships to get this timber to market. However, every step of progress made in any field of human endeavor, has exemplified the truth of the saying "Necessity is the mother of invention" and in this field it certainly has had much to do in helping the lumberman solve the great problem of moving the timber from the stump to the saw.

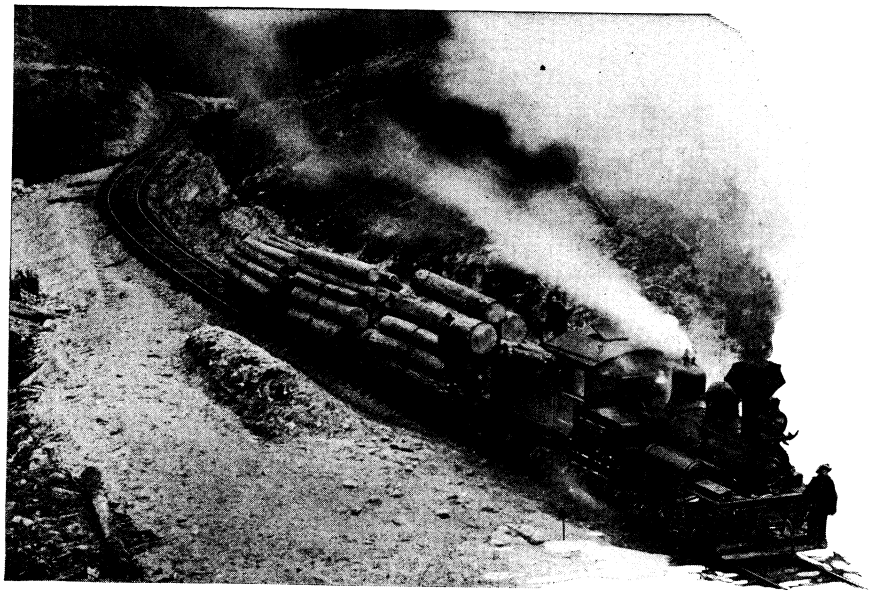
In traveling over the country one will find numerous modes of transportation. The one com-



Logging Railroad, Reliance Logging Company, Alder, Washington, 70-ton Shay Locomotive Hauling Train Load of Logs on 12 per cent Grade.

mon to all sections is that of the Logging Railway, which is operated by locomotives. Logging by this method in the United States dates back as far as 1832 when Samuel Veazie used a locomotive built in England by Stephenson, to haul timber from Old Town Mills to Bangor, Maine. The locomotive of those days found only a limited use, as the type generally known was not suitable to be utilized to any great extent as conditions were adverse to operating same economically.

The Geared Locomotive, which more than 30 years ago started its career in the woods of northern Michigan, is playing a heavy part in the operations of all lumbermen. You may go to the forest in any part of the United States, in fact, the world, and you will find the same geared locomotive. It is commonly known among the lumbermen as the "Shay" or "Lima". Rough and rugged country offers no unsurmountable difficulties to this type of geared locomotive.

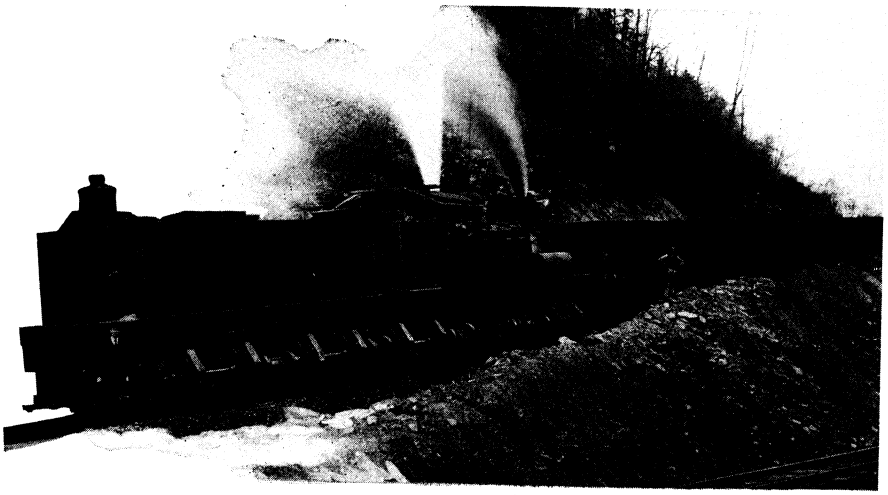


LOGGING RAILROAD, WINSLOW LUMBER CO., ORIN, WASHINGTON, 42-TON SHAY LOCOMOTIVE, 14 PER CENT GRADE.

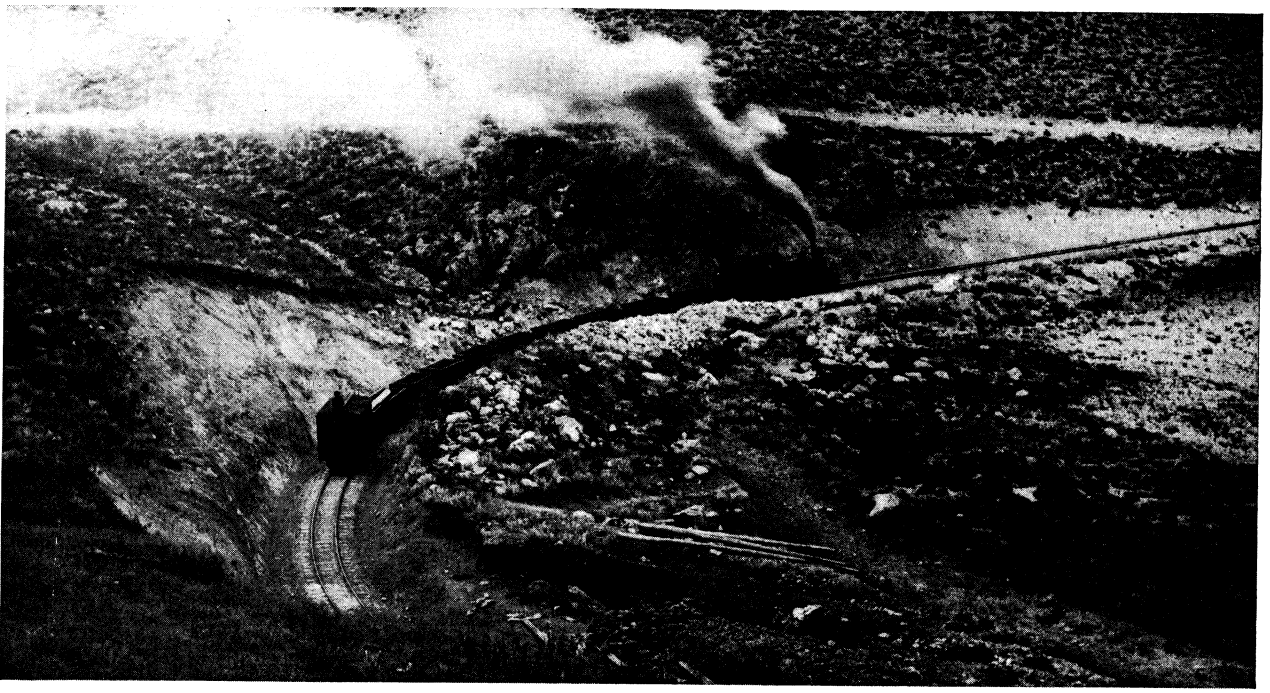
There are many logging railways on which the grades will run 8 to 10 per cent and a number ranging from 10 to 16 per cent, which are being operated with the Shay Locomotive. On these roads curves from 50 to 100 feet radius are not uncommon. The Shay although originally designed for service on logging railroads has passed to many other spheres.

It has been the means of opening up the land for settlement in various parts of the world. In South America, the Shay was used in building the Guayquil and Quito Railway, where the grades were 8 per cent and it was necessary to weave around the side of the mountain by means of switch backs until the summit was reached. A view from a distance gave the observer the impression of a row of stair steps. In Australia it was used to open up territory which was isolated from the outside world and later it has entered into a new field, "City Switching on the Kansas City Southern Railroad's New Terminal in Kansas City".

When the Wolgan Valley Railway in Australia was carried some 30½ miles inland from Newnes Junction, on the New South Wales Government System, in order to tap the Shale Oil Fields, the



SWITCH BACK, LOOP CREEK BRANCH OF CHESAPEAKE & OHIO RAILWAY, 150-TON SHAY PUSHING TRAIN UP 4½ PERCENT GRADE.



View on Mining Railroad, Empire Copper Co., Mackay, Idaho, 6 Per Cent Grade, 34-degree Curve, 24-ton Shay Locomotive.

fact that there was 1760 feet difference in altitude in this distance which had to be overcome, offered a somewhat perplexing condition to the surveyors. The location gave banks of 5 to 5½ per cent and curves of 330 feet radius which could not be eased, owing to the surface of the country. The operation of such a railroad as an ordinary adhesion road brought forth considerable anxiety as it was thought that it could not be successfully operated. After close investigations and examining a number of roads of similar conditions where the Shay locomotives were successfully operating, the Shay was adopted. Three 70 tons and one 90 ton are now in service on this road.

Another wonderful railroad which is being operated with Shay locomotives is that of the Mill Valley and Muir Woods Railway, formerly known as the Mill Valley and Mt. Tamalpais Scenic Railway, which runs from Mill Valley on the northern shore of the Bay of San Francisco to the summit of Mt. Tamalpais. This line contains 8 per cent grades and curves of 70 feet radius. It is 8½ miles in length and the longest piece of straight track is 413 feet. The number of curves on the road is 281, one of them being known as the famous "Bow-knot Curve". This road is called "The Crookedest Railroad in the World".

The Shay locomotive is in use on the Arica La Paz Railway, Chili Bolivia Line, crossing the Andes from Arica in Chili to La Paz in Bolivia. This line does not traverse the roof of the world as that lies in Asia where the mighty Himalayas rear their peaks far above the clouds but it can be said with truth to run on the "earth's top floor". In many places in its course it attains a height of 14000 feet above sea level, which is the highest point in the world reached by a regular railroad.

There are many other roads operated across difficult country by the Shay Geared locomotives such as the Mt. Arisan Railway in Formosa, the Transadine Railway in South America, which also crosses the Andes, and a railway in China known as the Railway of Three Provinces which follows the course of the "Great Wall".

Built in sizes from 10 to 160 tons it is adapted to all classes of service and gives to it the title which is found in the heading of this article.

PUMPING LOCOMOTIVES

In the present day of high operating costs and restricted rates, railroads must look to every possibility in the way of economy in operation and maintenance if they are to be, even in a measure, successful business propositions. Inasmuch as the cost of locomotive fuel is one of the largest items in the operating costs of railroads, it must be conceded that this item presents great possibilities in the way of saving. Much has been written on the subject of fuel economy generally and this article will only treat on that in so far as supplying water to the boiler is a contributing factor.

Boiler maintenance is also a considerable item of expense and any methods which reduce this cost in connection with fuel economy, if accompanied with increased efficiency, should be doubly pleasing.

Most men in positions in the mechanical department of railways, who have come into those positions by way of the scoop shovel and oil can route, thoroughly appreciate the possibilities of economy due to properly supplying water to the locomotive boiler. Others in these positions who have not had the privilege of firing and running a locomotive are less apt to appreciate the importance of giving this subject careful consideration.

Water can be supplied to a boiler only with the expenditure of energy. It matters not whether the manner of supplying it be a pump or an injector, considerable power must be expended.

The writer commenced firing a locomotive in the days of the old cross-head pump. With the introduction of the injector men were inclined to practices acquired in using the pump and which gave unsatisfactory results in connection with the injector's use. In some cases these practices were entirely wrong when applied to an injector as a means of feed water supply. With a pump the supply of water to the boiler ceased when the locomotive came to a standstill. This brought about the practice on the part of many of the old-time engineers of setting the "lazy cock" of the pump so the water would be kept at an exact height when the engine was working. Of course, when the engine stopped the supply of water stopped and any water put in while drifting had a chance to warm and get circulation while the engine was standing. They would also gauge the opening of the lazy cock so there was always room for putting some water in while drifting, which was a good thing. This, however, led to a practice with the injector of setting the water valve at a capacity which would permit of the injector being worked continually without getting too much water in the boiler, even though the stops were in some cases of considerable length. Sight was lost of the fact that while standing the water introduced had not the forced draft of the exhaust and the using of the steam to get it hot and in circulation. The result was that in pulling out after a stop the pressure would drop back materially and it would require the best efforts of a skillful fireman to regain the lost pressure, and oftentimes this was not accomplished at all, or was accomplished just before the throttle was closed for the next stop. As a result the pops would lift and the amount of water thus lost would be almost if not quite as much as would have been put in while standing at the station.

Every gallon of water in a locomotive boiler when starting over and above the amount necessary to protect the fire box and flues, up to the point where dry steam is insured to the cylinders, represents stored-up heat; heat to be drawn upon for efficiency in cases of emergency; heat to be drawn upon for economical purposes if no emergency arise. From the above it will be readily admitted that we should have every gallon of water in the boiler possible when starting and still insure dry steam. The pressure should also be at the maximum without the pops opening.

The engineer, being familiar with the road over which he is to handle a train, and knowing what stops and shut offs will be necessary, should figure in advance of the run the proper method and time of pumping. If an engine is not too full of water to start a train it is not too full to commence putting in water as soon as the train is under motion and the lever hooked up. It does not necessarily follow that the injector should be put to work at once. Circumstances must determine this. If it happens to be a local passenger run, where the stops are frequent, it may not be necessary to put the injector at work until about to shut off for the next station. If such a course is possible the engineer should instruct the fireman not to hurry the fire in pulling out, but to keep the pressure near the maximum. If the injector is put to work just before the throttle is closed, and set to full capacity the boiler can be filled up to the desired level before starting again and still shut off soon enough before the start is made to have the water warmed up and in circulation when the throttle is again opened. It should be borne in mind at all times that water put in when the boiler is not being called upon to supply steam to the cylinders is put in much more cheaply than when working steam. If the run is to be a long one before shutting off and possibly very severe the injector should be put to work as soon as the pressure is near the popping point

and before the pops lift. The fireman should see that this pressure is had by the time the lever is hooked up to the running cut-off and the engineer should not wait for the opening of the pops to warn him that it is time to put the injector to work. The injector feed should be so adjusted that water will gradually be lost. The engineer knowing the road and the run should be able to so make this adjustment that the water level will have dropped to about one gauge on a level road when the throttle is closed. If the distance or the time before the next opening of the throttle is short the fire pressure should be maintained right up to the time of shutting off. Just before the throttle is closed the injector should be set to full capacity, and if necessary to keep the pops from lifting the second injector should be put to work, but shut off as soon as the conditions are such as to insure the pops not lifting. The feed of the other injector should then be cut down if the pressure commences to fall. It should be shut off altogether soon enough to allow the water to get thoroughly warmed up and in circulation before the throttle is again opened. On a hilly or mountainous road where the train will roll down one side of a hill but requires severe work on the locomotive to make the up-grade, care must be exercised to see that so much water is not introduced while coming down the hill as to interfere with getting good results when the angle of the boiler is reversed on the up-grade. On some locomotives one gauge of water on the down-hill will become three gauges when climbing the hill on the opposite side. In this case if we were to put in two gauges on the down-hill run we would work water on the up-grade. The above conditions must always be taken into consideration when topping a summit. If the water is allowed to get low when making the ascent, though to protect the sheets with the rear of the boiler lowest, there will be danger of damage when the summit is passed and the angle of the water level reversed.

Some men, boiler makers particularly, will object to the introduction of an abnormally large quantity of water as suggested. Their contention is that the cooling effect will tend to contract the sheets suddenly and cause the seams and flues to leak. This will not be the case if the quantity is reduced as the pressure commences to fall. The writer followed this practice for many years while running an engine and never caused a firebox leak thereby. Some experiments recently made at the experimental station of the Bureau of Mines at Pittsburgh show that the temperature of the boiler sheets on the fire side is practically the same as that of the water on the other side. In fact, the difference is found to be so slight that it is measureable only with the most delicate instruments. From this it is obvious that the matter of harm to the sheets will occur only when the water is introduced in such large quantities that the steam pressure will fall.

It is the practice of some engineers, particularly with a poor steaming engine, to put water into the boiler faster than it is being used. This for the purpose of having a surplus which will permit shutting the injector off to allow the steam to pick up. Closing the injector under these circumstances is a signal to the fireman on many roads to rake the fire and thus encourage the objectionable practice of raking. While this shutting off of the injector allows the pressure to pick up, in the long run it will result in a loss of water and steam and many times cause a steam failure or it will at least be reported as such when in fact it is a man failure.

In many cases with poor steaming engines or with good steamers in very severe service, a fireman can keep up the pressure if the injector is set to lose a little water as outlined above, instead of gaining on the level. This enables satisfacotry and economical work to be accomplished, even under adverse conditions.

In superheater locomotive practice there is a tendency to carry water too high, on account of the fact that with high water the superheater will be converted into an auxiliary steam generator and water will not be thrown out of the stack and strike the engineer in the face. The benefits of the superheater are lost, however. The application of the pyrometer to superheated locomotives is a safeguard against this improper practice.

In filling up boilers at terminals where the engine is to have the fire cleaned or knocked out, great care should be taken to put in all the water that will be necessary up to the time of again firing up, before the fire is worked. Putting large quantities of water into a boiler directly after the fire has been removed caused more injury to firebox and sheets flues than any other one thing.

The same methods that make for fuel economy in the operation of a locomotive under favorable conditions, that is, good steaming qualities, fair service and proper use of steam, if followed with a poor steamer or in excessively hard service will certainly make for efficiency.—Railway Master Mechanic.

Remarkable Log Loading Record

This story of rapid log loading in Montana appeared in the Daily Missoulian of Missoula, Mont. The loader used was an "AMERICAN" made by the American Hoist & Derrick Co., of St. Paul.

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"A Montana record for log loading was made by the crew at Camp No. 1 of the Anaconda Company, near Potomac on the Blackfoot line of the Milwaukee, last Saturday. It is believed that the record will hold in a wider territory than Montana, but it is certain that the figures which the crew at No. 1 showed Saturday night set a pace for the local jurisdiction.

"The crew loaded 29 cars in eight hours and 33 minutes. The load numbered 2,179 logs—241,640 feet. The average loading was 471 feet to the minute. The logs run 9.04 to the thousand feet.

"The most rapid work of the crew was the loading of eight cars—60,270 feet—in two hours; this was at the rate of 502 feet a minute."

(Continued from Page 2)

Logging Roads to Supercede Drives

large amounts of lumber are to be transported for quite a distance," he declared.

In summing up the advantages of the use of a logging railroad, Mr. Lisherness claimed for such a method reliability and cheapness of operation, delivery of logs without loss from breakage, a lower cost of building and operating than cost of dams and driving on small streams, a saving in hauling and toting, possibility of operation on narrower roads than that the log hauler now in use, and in every way greater efficiency and safety in transporting logs from the timberland to points where large rivers or other means of transportation are available.

Mr. Lisherness advocated that all foresters should study civil engineering on account of the many problems which require a knowledge of that profession constantly arising in connection with large lumbering operations.

He spoke highly of the excellent work being done by the large pulp and paper concerns in Maine toward conservation of the timberlands of the State.

In speaking of methods of mapping and estimating standing timber, Mr. Kisherness said that the "cruiser" who once walked through a tract of woods and guessed at the amount of timber is now out of fashion. Even the method of dividing the tract into strips, actually counting the trees on a given strip and thus approximating the whole, is inefficient, he said. The modern idea is to measure approximately 5 per cent of the tract and thus estimate the whole.—American Lumberman.

Portable Electric Drills

The Independent Pneumatic Tool Company have just issued a circular, "E 2", describing the Thor Portable Electric Drills. This circular shows a number of different types of drills which are furnished with universal alternating or direct current motor. The Thor tools are guaranteed to give satisfaction and we understand are shipped on trial. They claim their tools are more ecomonical to operate and maintain, in fact, are 60 per cent more efficient than other makes.

There are so many different uses for tools of this description that it would be policy for every user of drills to investigate this line of tools. In locomotive repairing, repairing of cars, if the user has any electricity about his plant will find the electric drill to be a very good investment.

This circular can be obtained by writing to the Independent Pneumatic Tool Company at Thor Building, Chicago, Ill.


These Tests
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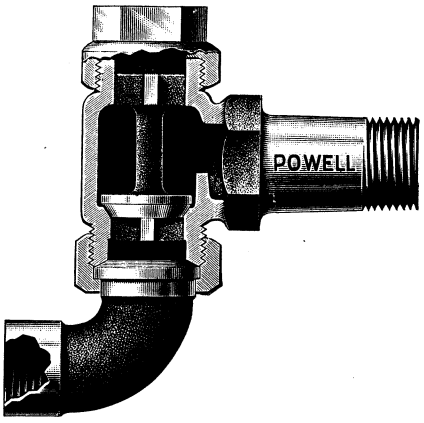
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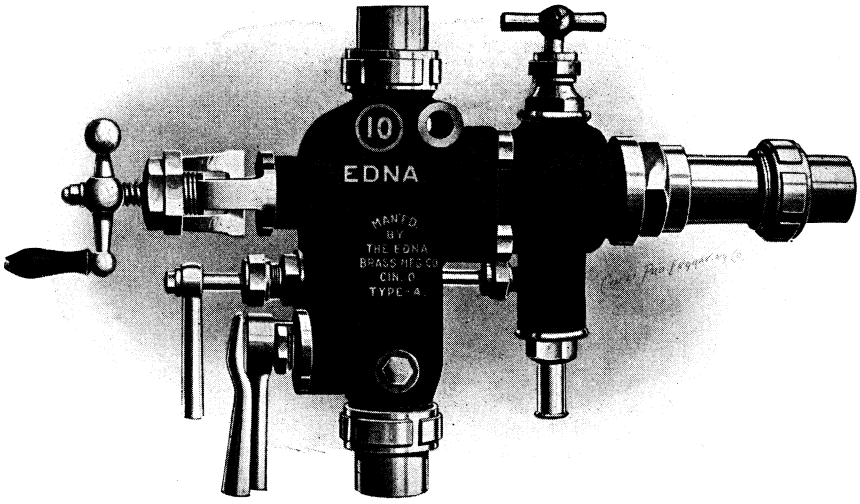
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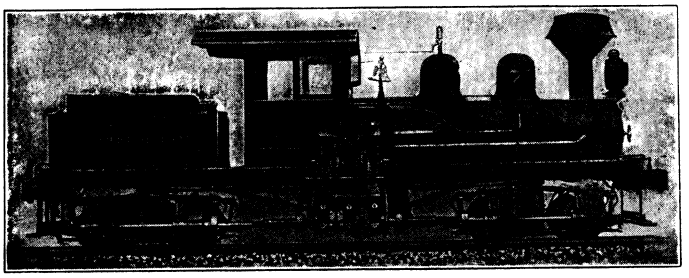
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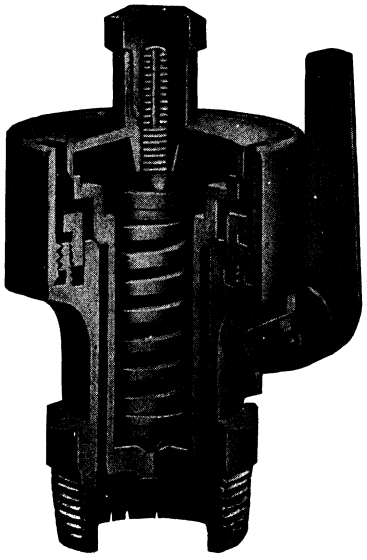
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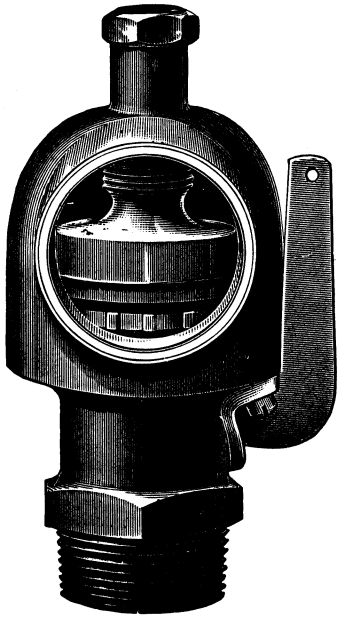
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